The great similarity of liquid ammonia and water in their dissociating power has led to a thorough study of the properties of liquid ammonia. It was found that in a considerable number of cases the nitrates of the metals were acted upon, when in solution in liquid ammonia, by the ammonium salts and a salt precipitated as a result of the metathetic reactions, if the salt formed was insoluble in ammonia. It was also found that many of the physical constants, which in the case of water are so entirely different from those of all other liquids, are almost as strongly characterized in the case of ammonia as in that of water. 'On the Constitution of the Phenylhydragones:' By P. C. Freer. 'Note on the Action of Liquid Hydriodic Acidon Ethylether:' By F. G. Cottrell and R. R. Rogers. In this case there was a partial conversion of the ether into ethyliodide. 'Contributions to our Knowledge of the Oil of Lemon-Grass:' By W. Stiehl. Isolation of the three aldehydes: Citriodoric aldehyde, Geranial and Allo-lemonal. The *American Chemical Journal* will hereafter appear monthly, and two volumes will be issued yearly. J. Elliott Gilpin.

We have received the first issue of *Science Work, a Monthly Review of Scientific Literature*, edited by Mr. Waller Jeffs and published at Manchester by Messrs. Robert Aiken & Company. It is stated in the introduction that the Journal 'will aim to give a general review of the world of science and present the reader as it were with the cream of the scientific press,' but we fear that it will be difficult to do this within the limits of eight pages published twelve times a year.

Natural Science, now published by Mr. Henry J. Pentland at Edinburgh, and still edited anonymously, but under new auspices, opens with the issue for January its fourteenth volume. The general character of the contents, which has always made *Natural Science* interesting and profitable, is well maintained.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

At the regular meeting of this Society held in Washington, D. C., January 11, 1899, Mr. Willard D. Johnson, U. S. G. S., read a paper on 'Subsidence Basis of the High Plains,' and Dr. C. Willard Hayes, U. S. G. S., one on the 'Lake Region in Central America.' Dr. Hayes' paper was based upon observations made recently in Central America while working under detail as geologist to the Nicaraguan Canal Commission. Abstracts of both papers follow.

Subsidence Basins of the High Plains.—The Great Plains structural slope has been superficially modified by streams from the Rocky Mountains, in three stages of gradation—a first stage, in which a hard-rock topography was developed by degradation; a second, in which this topography, by aggradation, became buried under an alluvial waste sheet to depths within its valleys as great as 300 feet; the third and present stage, in which the mountain streams are again engaged in cutting and have trenched the aggradation plain with parallel valleys, wide apart. But left thus above grade, this flat surface, in the greater part, has been eroded also by the drainage from its local precipitation. In notable exception is a transverse, mid-slope belt. Here the flat surface suffers no erosion from its local precipitation and has virtually no local drainage. It therefore stands in light relief. Transected by the mountain streams into broad plateaus of faint elevation, it forms a belt of residual tables or upland flats of survival. The Staked Plains plateau, of northwestern Texas, constitutes the best individual example. These are the High Plains—to some extent locally so-called. The Great Plains slope has a graduated climate—from humid to arid, east to west. The High Plains correspond in position to its 'subhumid' belt.

In the arid belt to the westward the vegetation—of grass and brush—grows in tufts. It affords but slight protection against the feeble precipitation, and the surface is conspicuously eroded. Upon the High Plains, within the subhumid belt, however, vegetation is wholly of grass, which forms a universal, close-knit sod. This vegetal cover affords complete protection against the considerable local precipitation. The High Plains are distinctively the 'short-grass country.' As a residual topographic belt, within the climatic belt, they are held by their sod. The local precipitation—so much of it as does not evaporate—is absorbed.

These uneroded tables, however, have a faint topography due to subsidence. The flat surface is extensively pitted with saucer-form depressions. Their dimensions vary from a foot or two in depth and a breadth of 100 feet to 75 feet in depth and a breadth of two or three miles. Wind action is plainly to be excluded. Occasionally they are surrounded, upon the hard, sod flats, by concentric cracks, deep enough to cause injury to cattle and to entrap calves.

These forms, large and small, without differences in type, are attributed to the operation of two distinct and unrelated processes: (1) settlement and compacting within the deep and unconsolidated mass of silt sand and gravel, through instrumentality of the ground-water; and (2) solution of salt and gypsum, and consequent caving, within the rocks of the floor, where those rocks are the Red Beds.

The concurrence of two unusual causes, to produce, alike, within a limited area, a result so unusual, appears, however, to be intelligible on this assumption, viz.: These processes are, in fact, of universal operation; they are at the same time of too light effect to stand a chance in competition with erosive agency; but the sod-covered, subhumid plains, remarkable in that they retain a flat surface unscored by erosion, afford exceptional opportunity for the preservation of their delicate record.

The Lake Region in Central America.—The region described includes southern Nicaragua and northern Costa Rica, extending from 10 degrees and 30 minutes to 12 degrees and 30 minutes north latitude, and from the Carribean to the Pacific. It includes the route of the projected Nicaragua Canal and the largest lakes of the western hemisphere south of the glaciated region of North America. The region is characterized by two types of topography, viz.: (1) the recent volcanic ranges and plateaus in which the original constructional forms are more or less perfectly preserved; and (2) the areas of Tertiary, igneous and sedimentary rocks in which the drainage is mature and the forms are due to long continued subaerial erosion. A noteworthy feature is the absence of any continuous mountain range or chain of dominant peaks through this portion of the isthmus. A shallow depression occupies the western portion of the region, its longer axis being nearly parallel with the Pacific coast. This contains Lakes Nicaragua and Managua. The former is 110 miles in length, with an area of 3,000 square miles and a mean altitude of 106 feet. Its greatest depth is 200 feet.

The climate of the region is tropical and insular, the annual range of temperature being small. The rainfall is greatest on the east coast, nearly 300 inches at Greytown, and decreases somewhat uniformly westward, being less than 80 inches on the west coast. Connected with the decrease in the rainfall there is a striking change in the character of the vegetation, the dense tropical jungle of the east coast giving place to open forests and savannahs in the west.

No rocks older than the Tertiary are formed along the line of the canal. They consist of eruptive and sedimentary formations, the former including basalt, andesite and dacite, and the latter calcarious sandstones and shales. In addition to these Tertiary rocks there are extensive recent alluvial deposits and the tuffs and lavas of the modern volcanoes. The conditions throughout the region, but particularly in its eastern portion, are favorable for rock decay, and the regolith is unusually extensive.

The late geologic history of the region is briefly as follows: In early Tertiary time this portion of the isthmus may have been wholly submerged. At any rate, marine sediments were deposited throughout a considerable part of its extent, and this was accompanied by intense volcanic activity. In middle Tertiary time there was an uplift and long continued erosion, the constructional volcanic topography being obliterated, and the region, at least toward the south, being reduced to one of low relief. The present basin of Lake Nicaragua was then occupied in part by a gulf connected with the Pacific to the northwest and in part by the valleys of tributary streams. The continental divide then occupied the hilly or mountainous region east of the lake, crossing the present San Juan valley near Castillo. In late Tertiary or post-Tertiary time the isthmus was elevated at least 300 feet and deeply dissected. Following the elevation was a renewal of volcanic activity. A series of vents opened on the

Pacific side and their ejecta built a dam across the outlet of the gulf, thereby forming the lake basin. As this dam increased in height the waters behind it were raised until they overtopped the continental divide and escaped to the Atlantic, forming the present San Juan. The region has suffered a recent depression by which the rivers were drowned, and their estuaries thus formed have since been silted up.

Wm. F. Morsell.

DISCUSSION AND CORRESPONDENCE.

MATTER, ENERGY, FORCE AND WORK.

To the Editor of Science: In the generous and appreciative review by Professor Mendenhall (in Science, p. 24, January 6) of my book on 'Matter, Energy, Force and Work' there occurs a line to which I would like to advert briefly. "'The something' which distinguishes *substance* from *matter* is *energy*. 'A designated quantity of substance consists of a definite quantity of matter in permanent association with a definite quantity of energy or motion.' The two words 'or motion' render this statement somewhat obscure. What is meant by a 'definite quantity of motion?' Professor Holman's definition of motion is that of nearly all writers, namely, 'change of relative position.' It is a curious but common practice to define it in this way and then to define its 'quantity' by associating with it something (matter, mass) absolutely unlike it in every respect. It is certainly not in this sense that he means to use it in the phrase above quoted."

I desire to express my assent to this comment and to reply to the query therein contained, or rather to remove, if I may, the obscurity. This result will, I think, be effected if for the words 'of motion' in the description of substance be substituted the phrase: *or permanently endued with some definite mode of motion.*

May I also add, to preclude possible misapprehension, that the proposition 'Continuous, uniform, and permanent occupancy of space,' quoted at page 25, is one which I do not advance as a definition of matter, or as a logical deduction from known premises, but only as a possible view of matter if the *unproved* hypothesis of the kinetic nature of all energy be adopted as a step in the inference.

With sincere thanks for your courtesy in presenting this review, I am

Yours truly,

Silas W. Holman.

Brookline, Mass., January 17, 1899.

ZOOLOGICAL BIBLIOGRAPHY.

To the Editor of Science: Dr. Dall's 'tolerably active and rather long experience' has been singularly blessed if he has never met with an advance copy of a paper issued at an uncertain date, not offered for sale, and conflicting in its contents with some other paper offered for sale at a known date about the same period; if he or the libraries he frequents have always been able to purchase without a delay of more than one year the new books or pamphlets that he wanted to see; if he has always had so much as a printed postcard in reply from authors whose works he has sought in exchange for his own; and if he has always been able to find the address of every writer with whom he wished to communicate. A restricted and short experience has acquainted me far too thoroughly with all these difficulties, but, as this is not an autobiography, the details need not be inflicted on your readers. Dr. Dall shall have them if he wishes.

Apart from his scepticism, Dr. Dall appears to agree, at least in spirit, with the proposal that he has now twice criticised. But two remarks of his seem to call for reply.

My committee has not yet definitely pronounced on the question: What constitutes publication? But it is safe to say that it does not regard printing as publication, and therefore sees no great value in placing 'the actual date of printing' on every signature. This, too, may be said: That a *British* Association Committtee would never recommend an author to sell his papers without an express agreement with the society that has been at the expense of setting up the type, and perhaps of drawing the plates. In our country this may be done, but it is not regarded as particularly creditable to the author that does it. Customs are, no doubt, different elsewhere; but our proposal was an attempt to render the speediest possible publication compatible with commercial morality as recognized here. Perhaps it is this